

EXHIBIT

4





CACACATG CTGCTGCTTAT GTTGGAGCT CTCAGCAAT GTCCACTTC TTCTCCCTGT AATCTCTTC CTCTGTGAGG AGCTCAGAG CATCCCTTA TGACACTTA CTAATCCAG GAGTACCTC 5644  
CACACCTT GGGTACAT GAGCTTTAA CACTATGTA AGACAGACA GGCATGAGG GATCTCTCTT GGTCTACTTC TTGCTACTGT TTGCTACTGT ACTGACTGC 5774  
TGCATGAGG GGGTGTGTA TTGCTACTT GAGCTTTAA CACTATGTA AGACAGACA GGCATGAGG GATCTCTCTT GGTCTACTTC TTGCTACTGT ACTGACTGC 5904  
TTCTCTCATT CAGTGGACT GTTGTGTGAG TACTGACTT TACTGACTT TACTGACTT TACTGACTT TACTGACTT TACTGACTT TACTGACTT TACTGACTT TACTGACTT 6034

137  
Met Glu Lys Lys Arg Ser His Leu Lys Arg Asp Thr Glu Asp Glu Gln Val Asp Gln Val Asp Pro Arg Leu Ile Asp Gly Lys Met Thr Arg Arg Gly Asp Ser Pro 6134  
ATC GAG AAG AAG CCG AGT CAC CAC CAC CAA GAA GAC CAA GAA GAT CCG CCG CTC ATT CAT GGG AAG ATG ACC AGG CCG GGA GAC ACC CCC 6259

184  
Trp Glu  
TGG CAG GTGGAGGAG AGGCAGCACC GGCCTGTCTAC GTCTGGGTC CGGATCACT GAGTCACTC TGGCACTAT GTCTAGGCTG CAGAACCCA CAGGAGGCG CTCCATTC GTTGGGGA 6385  
TGAATAGGT GGGGATCT TCAGGGAAG ATGACGCA CAGGAGGAG CAGGAGGAG GATCTGAGG GATCTGAGG GATCTGAGG GATCTGAGG GATCTGAGG GATCTGAGG GATCTGAGG 6515  
AGAGTGGAA AGACACTCT CTCTGTGGG GATTTAGCG AGAGGCTCG CTGATGGAG AGGCTAGGA GGGAGGCGG GGTCTGCTAG AGACCTCAGG GATCTGAGG GATCTGAGG 6775  
CCCTCTCTG CCAGGATGG GGGATAGG AACCAACAG TGGGATATT TCCCTGGG ACTGACTC TCCAGGCTC AGAGGCTCG AGAGGCTCG AGAGGCTCG AGAGGCTCG AGAGGCTCG 6905  
TCAATAGG GGTCTAGGA GGCAGAGG AACATCTAGG CAGCTGGG GGCAGAGG GGCAGAGG GGCAGAGG GGCAGAGG GGCAGAGG GGCAGAGG GGCAGAGG 7035  
CTGAGGCTA CTGAACACT ATGAACAGT CAGGAGGAG ATGGGAGG CAGGAGGAG CAGGAGGAG CAGGAGGAG CAGGAGGAG CAGGAGGAG CAGGAGGAG CAGGAGGAG 185

185  
Val Val Leu Leu Asp Ser Lys  
ATATGACAG GGAACCCAGG AAGTGTGATA TGAATCCAG GTCTCTGGA CTGGAGGCTG TCAGGAGGCA GGCCTGTCTC GTCTCTCTC CACCTCTCTC CACCTCTCTC CACCTCTCTC 7159

223  
Lys Lys Leu Ala Cys Gly Ala Val Leu Ile His Pro Ser Trp Val Leu Thr Ala Ala His Cys Met Asp Glu Ser Lys Lys Leu Val Arg Leu 7266  
AAG AAG CTG GCG TGG GCG GCA GCG CTC ATC CAC CCG TCC TGG GTG CTG ACA GCG GCG CAC TGC ATG GAT GAG TCC AAG AAG CTC CTT GTT AGG CTT G Y GATCTGCTG 7396  
GAGCCAGGCA GAGGAGGCT GCGAGGAGG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG GAGGAGGAG

224  
AAGAGGCTA TGTGCTCCA CCTGCTCCA CAGTATTT CAGTATTT CAGTATTT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT 7526  
CTTCTCTCT TCACTCTCA CAGTATTT CAGTATTT CAGTATTT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT 7656  
GAGAGGCTA GATCTGCTA AGGAGGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA GATCTGCTA 7786  
AAGAGGCTA GAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA AAGAGGCTA 7916  
TCTCTAGT GGGAGGCT GGTCTCTCT CAGTATTT CAGTATTT CAGTATTT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT 8046  
TGTCTAGT TCAAGGCT CAGTATTT CAGTATTT CAGTATTT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT 8176  
GAGAGGCTA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA TCACTCTCA 8306

224  
Gly Glu Tyr Asp Leu Arg Lys Trp Glu Lys Trp Glu Lys Asp 8426  
GAGTGGGCT GGCCTCAGGA AAGTGGCT GGGGAGGCT TCCCGAGG CCACTCTGAC TGTGCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT GGTCTCTCT

8531  
Leu Asp Ile Lys Glu Val Phe Val His Pro Asn Tyr Ser Lys Thr Thr Asp Asn Ile Ala Leu Leu His Leu Ala Gln Pro Ala Thr Leu Ser Gln Thr  
CTG GAC ATC AAG GAG GTC TTC CTC CAC CCC AAC TAC AAC AGC ACC ACC GAC AAT CAC ATC GCA CTG CTG GCG CCC GCG ACC CTC CTC GCG ACC

FIG. 2 CONT.

II

-30  
-40  
-2

Het Trp Gln Leu Thr Ser Leu Leu Phe Val Ala Thr  
CGC CGA ACT TCC AGT ATC TCC ACC ACC CCC TGT CCC ACT CCC TCC ACA ATG TCC CAG CTC ACA ACC CTC CTC TTC CTC GCC ACC 39

-1 +1  
-10

Het Trp Gln Leu Thr Ser Leu Leu Arg Ile Arg Lys Arg Ala  
TCG CGA ATT TCC CCC ACA CCA CCT CTT CAC TCA CTC TTC TCC ACC ACC CAG CGT GCC CAC CAG GTG CTG CGG ATC CGC AAA CGT GCC 129

30  
20

Asn Ser Phe Leu Glu Glu Leu Arg His Ser Ser Leu Glu Arg Cys Ile Glu Glu Ile Cys Asp Phe Glu Glu Ala Lys Glu Ile Phe  
AAC TCC TTC CTG CAG CAG CTC CGT CAC ACC ACC CTC CAG CGC CAG TCC ATA CAC CAG ATC TCT CAC TTC CAG CAG CCC AAC CAA ATT TTC 219

40  
30

Gln Asn Val Asp Asp Thr Leu Ala Phe Trp Ser Lys His Val Asp Gly Asp Gln Cys Leu Val Leu Pro Leu Glu His Pro Cys Ala Ser  
CAA AAT CTG CAT CAC ACA CTC GCC TTC TGG TCC AAC CAC CTC CAG CGT GAC CAG TGC TTG CTC TTC CCC TTG CAG CAC CCC TCC GCC ACC 309

70  
80

Leu Cys Cys Gly His Gly Thr Cys Ile Asp Gly Ile Gly Ser Phe Ser Cys Asp Cys Arg Ser Gly Trp Glu Gly Arg Phe Cys Gln Arg  
CTG TCC TCC CGC CAC CGC AGC TCC ATC CAC CGC ATC CCG ACC TTC ACC TCC CAC TCC CCC ACC TCG GAG CGC CTC TTC TCC CAG CGC 399

100  
110

Glu Val Ser Phe Leu Asn Cys Ser Leu Asn Cys Ser Leu Asn Gly Gly Cys Thr His Tyr Cys Leu Glu Val Gly Trp Arg Arg Cys Ser Cys Ala  
GAG CTG ACC TTC CTC CAT TGC TCT CTG CAC AAC CGC GGC TCC ACC CAT TAC TCC CTA CAC CAG CTC CGC TCC CGC TGT ACC TGT CGC 489

130  
140

Pro Gly Tyr Lys Leu Gly Asp Asp Leu Leu Gln Cys His Pro Ala Val Lys Phe Pro Cys Gly Arg Pro Trp Lys Arg Met Glu Lys Lys  
CCT GCC TAC AAC CAG CTC CGC CAC CAC CTC CAG TGT CAC CCC CCA CTC AAC TTC CTT GGC ACC GGC TCG AAC CGC ATC CAG AAC AAC 579

160  
170

Arg Ser His Leu Lys Arg Asp Thr Glu Asp Gln Glu Asp Gln Val Asp Pro Arg Ile Asp Gly Lys Met Thr Arg Arg Gly Asp Ser  
CCC AGT CAC CTC AAA CGA CAC ACA CAA GAC CAA CAA CAC CAA GTA CAT CCC CGC CTC ATT CAT CGC AAG ATC ACC AGG CGC CCA CAC ACC 669

190	200	210
Pro Trp Gln Val Val Leu Leu Asp Ser Lys Lys Leu Ala Cys Gly Ala Val Leu Ile His Pro Ser Trp Val Leu Thr Ala Ala His CCC TGG CAG CTC CTC CAC TCA AAG AAG CAG CTC CCC TCC GCG GCA CTC ATC CAC CCC TCC TGG GTG CTC ACA CCG CCC CAC		759
220	230	240
Cys Met Asp Glu Ser Lys Lys Leu Leu Val Arg Arg Leu Glu Tyr Asp Leu Arg Trp Glu Lys Trp Glu Leu Asp Leu Asp Ile Lys TCC ATC GAC CAG TCC AAG AAG CAC CTC CTT GTC AGG CTT GCA CAG TAT CAC CTC GCG CCC TCG CAG AAG TGG CAG CTC CAC ATC AAG		849
250	260	270
Glu Val Phe Val His Pro Asn Tyr Ser Lys Ser Thr Thr Asp Asn Asp Ile Ala Leu Leu His Leu Ala Gln Pro Ala Thr Leu Ser Gln CAG CTC TTC CTC CAC CCC AAC TAC AGC AAG ACC ACC CAC AAT CAC ATC CCA CTC CTC CAC CTC CCG CAC CCC ACC CTC TCG CAC		939
280	290	300
Thr Ile Val Pro Ile Cys Leu Pro Asp Ser Gly Leu Ala Glu Arg Glu Leu Asn Gln Ala Gly Gln Glu Thr Leu Val Thr Gly Trp Gly ACC ATA GTG CCC ATC TGG CTC CCC GAC ACC GCG CTT GCA GAG CCG CAG CTC AAT CAC GCG GCG CAG ACC CTC GTG AGG GCG TCG GCG		1029
310	320	330
Tyr His Ser Ser Arg Glu Lys Glu Ala Lys Arg Asn Arg Thr Phe Val Leu Asn Phe Ile Lys Ile Pro Val Val Pro His Asn Glu Cys TAC CAC ACC ACC CCA CAG CAG AAG CAG GCG AAC AGA AAC ACC ACC TTC CTC CTC AAC TTC ATC ATC MAG ATT CCC GTG CTC CCG CAC AAT CAG TCG		1119
340	350	360
Ser Glu Val Met Ser Asn Met Val Ser Glu Asn Met Leu Cys Ala Gly Ile Leu Gly Asp Arg Gln Asp Ala Cys Glu Gly Asp Ser Gly ACC CAG CTC ATG ACC AAC ATC CTC TCT CAG AAC ATG CTC GCG GCG ATC CTC GCG CAG CCG CAG GAT GCG TCG GAG GCG CAC AGT GCG		1209
370	380	390
Gly Pro Met Val Ala Ser Phe His Gly Thr Trp Phe Leu Val Gly Thr Trp Glu Glu Cys Gly Leu Leu His Asn Tyr Gly CGG CCC ATG CTC GCG TCC TTC CAC GCG ACC TCG TTC CTC CTC GCG CTC GCG CCG TGT CCG CTC CTT CAC AAC TAC GCG		1299
400	410	419
Val Tyr Thr Lys Val Ser Arg Tyr Leu Asp Trp Ile His Gly His Ile Arg Asp Lys Glu Ala Pro Gln Lys Ser Trp Ala Pro STOP GTT TAC ACC AAA GTC ACC CAC TAC CTC GAC TCG CAC ATC AGA GAC AAC GAA GCG CCG CAC AAG AGC TCG CCA CCT TAG CCA		1389

FIG. 3 CONT.